
स्वचल वाहन — बाहरी प्रक्षेपण
भाग 2 एम 1 वर्ग के अलावा अन्य वाहनों
के लिए कार्यकारी अपेक्षाएँ
(पहला पुनरीक्षण)

**Automotive Vehicles —
External Projections**

**Part 2 Performance Requirements for
Vehicles of Categories Other than M1**

(First Revision)

ICS 43.100

© BIS 2020



भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली – 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.gov.in www.standardsbis.in

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Body, Chassis, Accessories, Garage Equipment Springs and Suspension Systems Sectional Committee had been approved by the Transport Engineering Division Council.

The purpose of this standard is to reduce the risk of seriousness of body injury to a person hit by the body work or crushing against it in the event of a collision. There is also likelihood of injury to the passenger if some parts are projected out more than specified particularly while taking a turn or cornering.

This standard was first published in 1994 for all category of vehicles and was based on Safety Standard (SS 29) 'External projection' issued by Automotive Research Association of India (ARAI), Pune and uniform provisions concerning the approval of vehicles with regard to their external projections, EEC Regulation No. 26.

The Sectional Committee had decided to split the standard in two parts. The other part of the standard is:

Part 1 Performance requirements for M1 category of vehicles

In preparation of this standard considerable assistance has been derived from the ECE Regulation No. 61 — Uniform Provisions for the Approval of Commercial Vehicles with regards to their External Projections Forward of the Cab's Rear Panel.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard***AUTOMOTIVE VEHICLES — EXTERNAL PROJECTIONS****PART 2 PERFORMANCE REQUIREMENTS FOR VEHICLES OF CATEGORIES OTHER THAN M1***(First Revision)***1 SCOPE**

1.1 This standard applies to the external projection of vehicles of categories M2, M3, N1, N2 and N3 limited to the “external surface” as defined below. It does not apply to the exterior rear view mirrors, including their support, or to the accessories, such as aerials and luggage racks etc, if fitted.

1.2 The purpose of this standard is to reduce the risk or the severity of injuries sustained by a person coming into contact with the external surface of the vehicle in the event of an impact.

2 REFERENCE

The standards listed below contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards:

<i>IS No.</i>	<i>Title</i>
9435 : 2004	Terms and definitions relating to dimensions of road vehicles
14272 : 2011	Automotive vehicles — Types — Terminology

3 TERMINOLOGY

3.1 Vehicle — Vehicle shall be as defined in IS 9435 and IS 14272.

3.2 External Surface — It means the outside of the vehicle including the bonnet, the lid of the luggage compartment, the doors, the wings, the roof, the lighting and light signalling devices and the visible strengthening components.

3.3 Floor Line — The floor line determined as follows:

- A cone is selected (the height of which shall be convenient to handle) which has its side at an angle of 15° to the vehicles, vertical.
- The vehicle of which floor line is to be established shall be laden to its rated GVW.

- The cone, in its vertical position, shall be brought near the lowest possible position of the laden vehicle’s external surface.
- The cone shall be moved round the vehicle so that it comes in contact with its lowest point.
- These points of contact are then geometrically traced to find the floor line.
- In determining the floor line, no account shall be taken of the following:
 - Exhaust pipes,
 - Wheels,
 - Functional mechanical features attached to the under body, such as jacking points, suspension mountings, etc., and
 - Attachments for use in towing or in case of breakdown.

The gaps of the wheel arches are assumed to be filled in by an imaginary surface forming a smooth continuation of the surrounding external surface.

- The front bumpers’ shall be taken into account in determining the floor line. Depending on the type of vehicles, the trace of the floor line shall be at either the outer edge of the bumper or at the body panel below the bumper.
- Where two or more points of contact are observed at the same time, the lowest point of contact shall be used to determine the floor line.

3.4 Radius of Curvature — The radius of the arc of a circle which comes closest to the rounded form of the component under consideration.

3.5 Bumper — The front, lower, outer structure of a vehicle. It includes all structures, that are intended to give protection to a vehicle when involved in a low speed frontal collision and also any attachments to this structure.

3.6 Bumper Cover — The non-rigid outer surface of a bumper, generally extending across the full width of the front of a vehicle.

4 GENERAL REQUIREMENTS

4.1 The provisions of this standard shall not apply to those parts of the external surface of the vehicle which,

with the vehicle in the unladen condition, with doors, windows and access lids, etc, in the closed position, are either:

- 1) at height of more than 2 m;
- 2) below the floor line; or
- 3) so located that, in static conditions, they cannot be contacted by a sphere 100 mm in diameter.

4.2 The external surface of vehicles shall not exhibit, direct outwards, any pointed or sharp parts or any projections of such shape, dimensions, direction or hardness as to be likely to increase the risk or seriousness of bodily injury to a person hit by the external surface or brushing against it in the event of a collision.

4.3 The external surface of vehicles shall not exhibit, direct outwards, any parts likely to catch on pedestrians, cyclists or motorcyclists.

4.4 Projecting parts of the external surface, having hardness not more than 60 Shore A, may have a radius of curvature lower than the values prescribed fewer than 5 to 16.

5 ORNAMENTS, COMMERCIAL SYMBOLS, LETTERS AND NUMBERS OF COMMERCIAL MARKINGS

5.1 Ornaments, commercial symbols, letters and numbers, of commercial markings which project more than 10 mm from the surrounding surface shall retract, become detached or bend over under a force of 10 daN exerted at their most salient point in any direction in a plane approximately parallel to the surface on which they are mounted.

To apply 10 daN force a flat-ended ram of not more than 50 mm diameter shall be used. Where this is not possible, an equivalent method shall be used. After the ornaments are retracted, detached or bent over, the remaining portion shall not project more than 10 mm and shall not have any pointed, sharp or cutting edges.

5.2 Ornaments, commercial symbols, letters and numbers of commercial markings shall not have any radius of curvature of less than 2.5 mm. This requirement does not apply to these parts if they do not protrude more than 5 mm from the surrounding surface; however, in the case their edges directed outwards shall, be blunted.

5.3 If the added ornaments are less than 5 mm thick, minimum radius of curvature shall not apply, but the outward facing angles of such ornaments shall be blunted.

6 HEADLAMP VISORS AND RIMS

6.1 Projecting visors and rims shall be permitted on Headlamps, provided that their projection, as measured

in relation to the external transparent surface of the headlight, does not exceed 30 mm and their radius of curvature is at least 2.5 mm throughout.

6.2 Retracting headlamps shall meet the requirement in **6.1** in both the operative and retracted positions.

6.3 The provisions of **6.1** shall not apply to headlamps recessed in the body, or where the headlamp is overhung by the body, provided the bodywork conforms to the requirements of **4.3**.

7 GRILLES AND GAPS

Parts of grilles shall exhibit a radius of curvature of not less than:

- a) 2.5 mm, if the distance between adjacent parts is more than 40 mm;
- b) 1 mm, if the distance is between 25 mm and 40 mm; and
- c) 0.5 mm, if the distance is less than 25 mm.

8 WINDSCREEN WIPERS AND HEADLAMP CLEANING DEVICES

8.1 The above mentioned devices shall be such that the wiper shafts have a protective covering with a radius of curvature of not less than 2.5 mm and a surface area of not less than 150 mm² measured in the projection of a section not further than 6.5 mm from the most protruding point.

8.2 These units shall be so made as to have no sharp angles or pointed or cutting parts of a non-functional nature.

9 PROTECTIVE DEVICES (BUMPERS)

9.1 The ends of the bumpers shall be turned in towards the external surface in order to reduce the risk of fouling.

9.2 The components of the protective device shall be so designed that all rigid surfaces facing outwards, have a radius of curvature of not less than 5 mm. However, if a bumper cover is fitted, it shall have a radius of curvature of not less than 2.5 mm.

9.3 Equipment, such as towing hitches and winches shall not protrude beyond the foremost surface of the bumper. However, winches may protrude beyond the foremost surface of the bumper provided they are covered when not in use by a suitable protective covering having a radius of curvature of not less than 2.5 mm.

9.4 The requirements of 9.2 shall not apply to parts of the bumper or parts mounted on or inset in the bumper which project less than 5 mm. The edges of devices projecting less than 5 mm shall be blunted.

With respect to devices mounted on the bumpers and referred to in other clauses of this standard, the particular requirements contained in this standard shall be applicable.

10 HANDLES, HINGES AND PUSHBUTTONS OF DOORS, LUGGAGE COMPARTMENTS, BONNETS, VENTS, ACCESS FLAP AND GRAB HANDLE

10.1 The above parts shall not protrude more than 30 mm in the case of pushbuttons, 70 mm in the case of grab handles and bonnet-fasteners, and 50 mm in all other cases. They shall have radii of curvature of not less than 2.5 mm.

10.2 If lateral door handles turn to operate, they shall meet the requirements given in **10.2.1** and **10.2.2**.

10.2.1 In case of handles which rotate parallel to the plane of door, the open end of handles must be directed towards the rear. The end of such handles shall be turned back towards plane of the door and fitted into a protective surround or be recessed.

10.2.2 Handles which pivot outwards in any direction which are not parallel to the plane of the door shall, when in the closed position, be enclosed in a protective surround or be recessed. The open end shall face either rearwards or downwards. Nevertheless, handles which do not comply with this last condition may be accepted if:

- a) they have an independent return mechanism;
- b) should the return mechanisms fail, they cannot project more than 15 mm with reference to design intended closed position;
- c) they, in such opened position, have a radius of curvature not less than 2.5 mm (this requirement does not apply if in maximum opened position the projection is less than 5 mm, in which case the angles of the parts facing outwards shall be blunted); and
- d) their end surface area, when measured not more than 6.5 mm from the point projecting furthest, is not less than 150 mm².

11 WHEEL NUTS, HUB CAPS AND PROTECTIVE DEVICES

11.1 The wheel fasteners and hub caps shall not exhibit any fin shaped projections.

11.2 When the vehicle is travelling in a straight line, no part of the wheels other than the tyres, situated

above the horizontal plane, passing through their axis of rotation, shall project beyond the vertical projection in a horizontal plane, of the body panel edge above the wheel. However if functional requirements so warrant, the protective devices which cover wheel nuts and hubs may project beyond the vertical projection of the body panel edge above the wheel, on condition that radius of curvature of the surface of the projection part is not less than 5 mm and projection beyond the vertical projection of the body panel edge above the wheel in no case shall exceeds 30 mm.

12 SHEET METAL EDGES

Sheet metal edges, permitted provided that the edge is folded back or towards the body so that it cannot be touched by a sphere of 100 mm diameter or is provided with a protective covering having a radius of curvature of not less than 2.5 mm.

13 BODY PANEL

Folds in body panels may have a radius of curvature of less than 2.5 mm, provided that it is not less than one-tenth of the height 'H' of projection, measured in accordance with the method described in Annex A.

14 LATERAL, AIR OR RAIN DEFLECTORS AND WINDOW ANTI-SMEAR AIR DEFLECTORS

Edges capable of being directed outwards shall have a radius of curvature of not less than 1 mm.

15 JACKING BRACKETS AND EXHAUST PIPE(S)

15.1 The jacking bracket shall not project beyond a distance of 10 mm more than the vertical projection of the floor line lying directly above it.

15.2 Notwithstanding the above requirement, an exhaust pipe may project more than 10 mm provided that its edges are rounded at the end to a radius of curvature of not less than 2.5 mm.

16 RUNNING BOARDS AND STEPS

The edges of running boards and steps shall be rounded.

17 MEASUREMENTS OF PROJECTIONS AND DISTANCES

Method of determining the dimensions of the external projections is given in Annex B.

ANNEX A

(Clause 13)

A-1 The height 'H' of a projection is determined graphically by reference to the circumference of a 165 mm diameter circle, internally tangential to the outer line of the external surface at the section to be checked.

A-2 H is the maximum value of the distance, measured along a straight line passing through centre of the 165 mm diameter circle, between the circumference of the aforesaid circle and the external contour of the projection (see Fig. 1).

A-3 In case where it is not possible for a 165 mm diameter circle to contact externally part of the

outer line of the external surface at the section under consideration, the surface outline in this area shall be assumed to be that formed by the circumference of the 100 mm diameter circle between its tangent points with the outer line, (see Fig. 2). 'H' shall be determined as in A-2.

A-4 Drawings of the necessary sections through the external surface shall be provided by the manufacturer to allow the height of the projections referred to above to be measured.

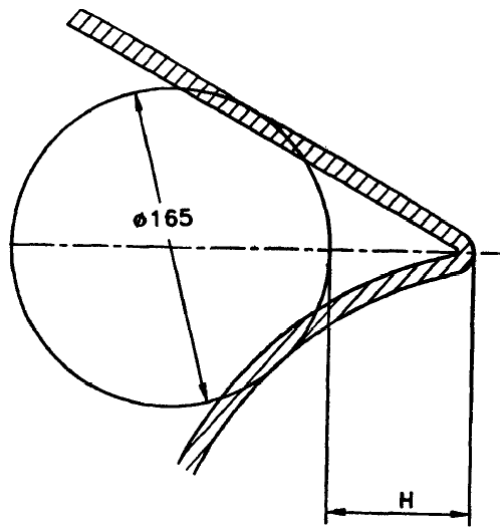


FIG. 1 METHOD FOR DETERMINATION OF HEIGHT 'H' BY DRAWING A CIRCLE OF 165 MM

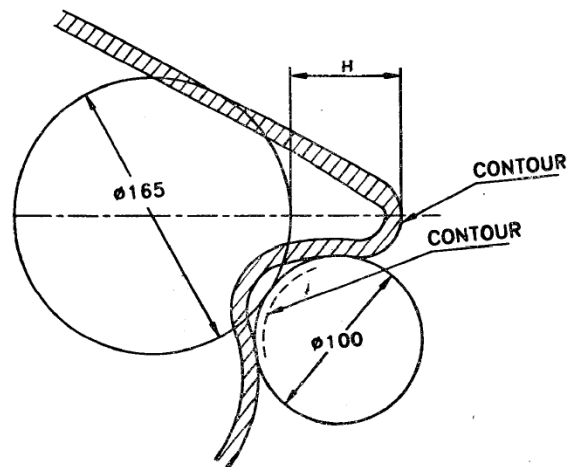


FIG. 2 METHOD FOR DETERMINATION OF HEIGHT 'H' BY DRAWING A CIRCLE OF 165 MM AND 100 MM

ANNEX B

(Clause 17)

MEASUREMENTS OF PROJECTIONS AND DISTANCES

B-1 METHOD OF DETERMINING THE DIMENSIONS OF THE PROJECTION OF A PART FITTED ON THE EXTERNAL SURFACE

B-1.1 The dimensions of the projection of a part mounted on a convex panel may be determined either directly or by reference to a drawing of an appropriate section of the part in the fitted position.

B-1.2 If the projection of a part mounted on a panel other than convex cannot be determined by simple measurement, it shall be determined by the maximum variation in the distance between the reference line of the panel and the centre of a sphere of 100 mm diameter when the sphere is moved in constant contact with the part. An example of the use of this method is given in Fig. 3.

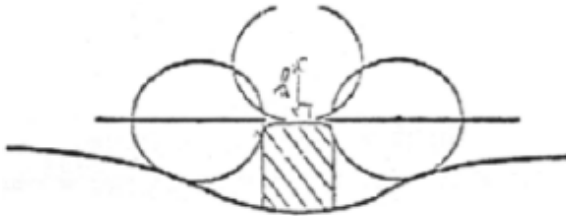


FIG. 3

B-1.3 For grab handles, the projection shall be measured in relation to a plane passing through the points of attachment. An example is given in Fig. 4.

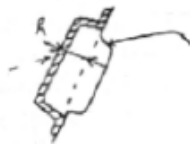


FIG. 4

B-2 METHOD OF DETERMINING THE PROJECTION OF HEADLAMP VISORS AND RIMS

The projection from the outer surface of the headlamp shall be measured horizontally from the point of

contact of a sphere of 100 mm diameter, as shown in Fig. 5.

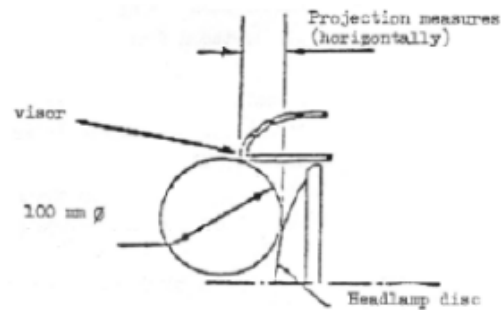


FIG. 5

B-3 METHOD OF DETERMINING THE DISTANCE BETWEEN PARTS OF A GRILLE

The distance between parts of a grille shall be the distance between two planes passing through the points of contact of the sphere and perpendicular to the line joining the points of contact. Examples of the use of this method are given in Fig. 6 and Fig. 7.

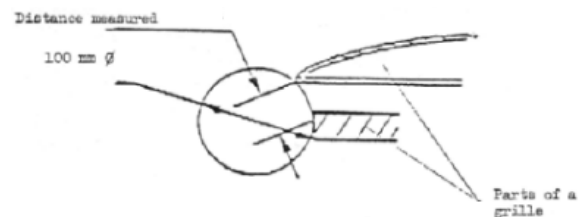


FIG. 6

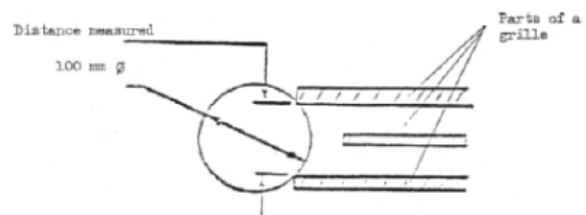


FIG. 7

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 2016* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc No.: TED 06 (13302).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402

Website: www.bis.gov.in

Regional Offices:

Telephones

Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{ 2323 7617 2323 3841
Eastern	: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi KOLKATA 700054	{ 2337 8499, 2337 8561 2337 8626, 2337 9120
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg CHANDIGARH 160019	{ 265 0206 265 0290
Southern	: C.I.T. Campus, IV Cross Road, CHENNAI 600113	{ 2254 1216, 2254 1442 2254 2519, 2254 2315
Western	: Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI 400093	{ 2832 9295, 2832 7858 2832 7891, 2832 7892

Branches : AHMEDABAD. BENGALURU. BHOPAL. BHUBANESHWAR. COIMBATORE.
DEHRADUN. DURGAPUR. FARIDABAD. GHAZIABAD. GUWAHATI.
HYDERABAD. JAIPUR. JAMMU. JAMSHEDPUR. KOCHI. LUCKNOW.
NAGPUR. PARWANOO. PATNA. PUNE. RAIPUR. RAJKOT. VISAKHAPATNAM.

Published by BIS, New Delhi